MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—The sanidinite bombs from San Miguel, one of the Azores group of islands, are regarded by Paun[2] as the first products of the crystallization of the magmas from which the existing phonolitic and trachytic rocks resulted, and not ae altered pieces of some foreign rock caught up by the magma in its passage to the surface of the earth. They are coarsely crystalline aggregates of sanidine, augite, with which are associated other less common minerals, as pyrrhite, azorite and lavenite. The sanidins is intergrown with albeite lamellæ having the position of the dome $13 P\bar{\infty}$. The hornblende is similar to arfredsonite in composition, and has an extinction of about 34° in plates parallel to the clinopinacoid. The lavenite has all the properties of this mineral as described by other writers.[3] Its extinction on the clinopinacoid is 21°. The little hyacinth-red octahedra of *pyrrhite*, which were regarded by Hubbard as probably belonging to a titanate, were isolated and found to be crystals of a niobate related to pyrochlor or koppite. The *azorite* was analyzed, yielding: $ZrO_2 = 66.3\%$; $SiO_2 = 35.3\%$—very nearly the composition of zircon.—In a brief synopsis of a paper now in course of publication in the *American Geologist*, Mr. Haworth[4] communicates some interesting notes on the Archæan rocks of Missouri. In a diabase porphyrite, from Madison county, are areas of quartz, which seem to be the remains of porphyritic crystals, whose original outlines have been destroyed by the corroding action of the diabase magma before its consolidation. Since an analysis of the rock reveals a content of only 53.4% of silica, it would seem that we have another[5] instance illustrating the possibility of the separation of free silica from a very basic magma. In another porphyrite the rare rock constituent piedmontite was detected. A very instructive fact in connection with the Missouri rocks is the existence of granites of idiomorphic orthoclase crystals which have been enlarged by the addition of orthoclase material. In some cases this enlargement is in the shape of a granophyre border, and in others of a solid vein of irregular outline surrounding a well-marked idiomorphic crystal.—In the course of an examination of a minette from Weiler, near Weiselburg, Alsace, Linck[6] found the porphyritic crystals of biotite to be surrounded

[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.
[2] Neues Jahrb. f. Minn., 1888, i., p. 117.
[3] Amer. Naturalist, 1887, p. 850.
[4] Johns Hopkins Univ. Circulars, No. 65, April, 1888.
[5] American Naturalist, 1887, p. 372.
[6] Mitth. d. Comm. f. d. Geol. Landesuntere, von Elsass-Lothringen, 1887, i., p. 69.

by the dark zones so characteristic of the mineral in rocks of this class; when treated with hydrochloric acid, the dark color of the external rim was destroyed, leaving an isotropic substance, which the author supposes to be amorphous silica. He explains the origin of the zinc by supposing the biotite to have been acted upon by the remainder of the liquid magma, from which it had separated, and thus to have lost a portion of its alkaline and alkaline-earth constituents, which helped to form the feldspar, forming with small plates of biotite the entire groundmass of the rock. The iron left by this decomposition separated out as magnetite in the dark zinc.—In a late number of the *American Journal of Science* Mr. Kemp[1] describes a dyke of camptonite cutting the rocks in the Forest of Dean magnetite mine in Orange county, N. Y. The rock differs from the typical[2] camptonite in containing a larger proportion of feldspar and smaller crystals of hornblende. The feldspar is an oligoclase with the composition:—

SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2	Loss.
48.19	16.79	18.37	6.85	1.32	1.11	5.59	2.31

—While engaged in studying a peridotite from Little Deer Isle, in Maine, Mr. Merrill[3] noticed the enlargement of its augitic constituents by the growth around it of a secondary augite with the same optical orientation, but a different color.

Mineralogical News.—In a very interesting paper on the chemical constitution of the different colored *micas* occurring in a pegmatite at Schüttenhofen, Bohemia, Scharizer[4] records the analyses of several members of the mica group of minerals, and draws some general conclusions in regard to them. The pegmatite is surrounded on all sides by limestone. Its constituents are arranged in three zones, in the first of which *lepidomelane* and white and brown *muscovite* occur. In the second a yellowish white muscovite, and in the third *lithium micas*. Analyses of these are given as follows:—

	Lepidomelane.	Brown Mus.	Yell.-white Mus.	Lithium-mica.[5]
SiO_2	35.31	43.67	44.08	49.26
TiO_2	1.20			
SuO_2	.16			.06
Al_2O_3	22.62	36.69	36.83	25.27
Fe_2O_3	5.68	2.10	.48	
FeO	18.04	.55	.74	.84
MnO	1.19	tr	.25	.85
MgO	3.69			
CaO			1.99	

[1] Amer. Jour. Sci., April, 1888, p. 331.
[2] Ib., III, xvii, p. 147.
[3] Ib., June, 1888, p. 488.
[4] Zeits. f. Krystallographie, 1888, xiii., p. 449.
[5] Cf. Am. Jour. Sci., xxxii., p. 353.

K_2O	8.61		11.10	
$(K.Rb.Cs)_2O$		8.57		13.85
Na_2O	.62	1.95	.21	.35
Li_2O	.30	tr	.37	5.38
H_2O	1.21	4.35	4.98	1.76
Aq	2.30	1.15	1.17	
Fe	.60	.35	.19	5.68

In the discussion which closes the paper Scharizer concludes that all lepidolites are isomorphous mixtures of the pure muscovite molecule with the molecule $(HO.F)_6.\ R^1_8\ Al_6\ Si_{10}\ O_{30}$.—A suite of specimens representing the rarer copper minerals of the Mammoth Mine region in Utah, having come into the possession of Messrs. Hillebrand and Washington,[1] an investigation of their physical and chemical properties was undertaken to determine their true nature. Measurements of the interfacial angles of *olivenite* from the American Eagle mine yielded as the axial ratio for this mineral .9396 : 1 : .6726. It was impossible to determine whether the mineral is orthorhombic or not in consequence of the poor reflections from the $\infty \bar{P} \bar{\infty}$ faces. Olivenite from the Mammoth Mine is well crystallized, with a tabular or prismatic habit. The planes most prominent on it are $\infty \bar{P} \bar{\infty}$, ∞P, $P \breve{\infty}$, $\infty P \breve{\infty}$ and $\bar{P} \bar{\infty}$. Its pleochroism is olive-green parallel to *c*, and brownish yellow parallel to *b*. On small hexagonal crystals of *chalcophyllite* the two new planes $-\frac{1}{3}R$ and $-\frac{1}{6}R$ were noticed. These crystals are tabular in habit, with OP largely developed, and are grouped into little rosettes. *Clinoclasite* occurs both in crystals and in globular and barrel-shaped forms, due to the grouping of crystals in a position varying slightly from parallelism. On the crystals, which are usually elongated in the direction of the *b* axis, the two new forms P and $\frac{1}{3}P$ were detected. Analyses indicate the correctness of the formula usually ascribed to this mineral, viz.: $Cu_3\ (AsO_4)_2 + 3Cu\ (OH)_2$. Two types of *brochautite* (hydrous sulphate of copper) were also examined. Crystals of the first type are dark green, and are prismatic in habit. Those of the second type are of a light green color, and have a curved double-wedge shape, produced by the occurrence of $3\ \bar{P}\ \bar{12}$ and $\infty P \breve{\infty}$ faces. A mineral with the general appearance of *tyrolite* yielded Mr. Hillebrand:—

CuO	ZnO	CaO	MgO	As_2O_5	P_2O_5	H_2O	SO_3
46.38	tr	6.69	.04	26.22	tr	17.57	2.27,

a result indicating a composition corresponding to $5CuO.\ As_2O_5.\ 7\frac{1}{2}H_2O$, instead of to the generally accepted formula, $5CuO.\ As_2O_5.\ 9H_2O$. The mineral forming delicate tufts of silky needles of a light color, supposed by Mr. Pearce[1] to be a new mineral, has been found upon closer examination to have the composition of *Mixite* $(Cu_{20}\ Bi_2\ As_{10}\ H_{44}\ O_{70})$, but different physical properties. It is uni-

[1] Amer. Jour. Sci., xxxv., April, 1888.

axial or orthorhombic, and its specific gravity is 3.79.—According to Prof. Chester,[1] the *marcelite* from Cumberland, R. I., and the photicite and klipsteinite from Jackson county, N. C., are nothing more than mixtures of rhodonite and its decomposition products, a conclusion to which Prof. Bauer,[2] of Marburg, assents.—Native *platinum* and *cinnabar* are reported[4] as occurring in British Columbia. The former has been found in the bed of a branch of the north fork of Similkameen River. It is in the form of rounded grains and pellets. It has the composition:—

Pt	Pd	Rh	Ir	Cu	Fe	Os Ir	Gaugue.
72.07	.19	2.57	1.14	3.39	8.59	10.51	1.69

The rare minerals[4] *uranite, gummite* and *uraconite* have also been found in Canada, at the Villeneuve mica mine, Ottawa county, Province of Quebec.—*Xanthitane*, from Green river, Henderson county, N. C., is an alteration product of sphene. It is apparently a clay with the silica replaced by titanium. The air-dried substance loses 6.02 per cent. of water at 100°. The composition of the dried material is:—

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	CaO	P_2O_5	H_2O
1.76	61.54	17.59	4.46	.90	4.17	9.92

—Bement[5] mentions the occurrence of fine crystals of *wulfenite* at the Red Cloud mine in Arizona, and beautiful *azurite* and *malachite* at Bisbee, in the same State.—Knop[6] declares the olivine from the limestone of Schelinger, in the Kaiserstuhl, to be *forsterite*, with the composition:—

SiO_2	MgO	FeO	MuO	Al_2O_3
41.88	49.83	4.56	1.73	trace

CRYSTALLOGRAPHIC NEWS.—In a very interesting paper recently published, L. Wulff[7] shows that each of the three possible kinds of tetartohedrism probably occurs on crystals of the regular system. The forms derived by the three different kinds of selection can, however, not be distinguished from each other and from some of the hemihedral forms in the same system, except by a combination of morphological and physical observations. By these methods Wulff is lead to conclude that the bromate and chlorate of sodium crystallize in the gyroidal-tetrahedral division, and that the

[1] Neues Jahrb. f. Min., etc. 1888. I., p. 187.
[2] Ib., p. 214
[3] Ann. Rep. Geol. and Nat. Hist. Surv. of Canada in 1886. T. p. 5. Ib. p. 10.
[4] Eakins. Am. J. Science, May, 1888, p. 418.
[5] Zeits. f. Kryst., xiii., 1887, p. 46.
[6] Ib., xiii., 1887, p. 236.
[7] Zeits. f. Kryst., xiii., 1887, p. 273.

nitrates of barium, strontium and lead crystallize in the pentagonal-tetrahedral division of the regular system. Analogous results[1] follow from a discussion of the possible kinds of letartohedrism in the other systems.—Scharizer[2] describes honey-yellow to greenish *xenomite* crystals from a pegmatite vein near Schüttenhofen, Bohemia. The most prominent type is that produced by the combination of the prisms and pyramid with the ditetragonal pyramid, though ricinal planes obscure to some extent the tetragonal symmetry of the mineral. The axial relation is 1 : .62596. In a second type the prismatic faces are wanting.—Wine-yellow crystals of *barite* from the phenolite of Oberschaffhausen, in the Kaiserstuhl, have been examined by Beckenkamp.[3] Three types are recognized. The first is characterized the large development of the prismatic and basal planes, while the second type contains in addition the brachydomes. The third type contains the latter faces developed to the almost complete exclusion of the prismatic faces. The axial ratio of the crystals is .8151 : 1 : 1.3019. They are pleochroic in yellow and white tints.—Cathrein[4] has found in the *adularia* from Schwarzenstein, Zillerthal the prismatic faces $\infty \bar{P}\frac{9}{5}$, $\infty \bar{P}\frac{8}{5}$ and $\infty \bar{P}\frac{7}{5}$, the orthodomes $\frac{8}{7}\bar{P}\infty$ and —$280\bar{P}\infty$, and the orthopyramid $\frac{21}{20}\bar{P}9$, all of which are new to orthoclase.—Crystals of *chalcopyrite*[5] from Holzheim, in Nassau, are interesting in that they contain the scalenohedron modified only by the very small planes $\frac{P}{2}$ and $2P\infty$.

[1] Ib., xiii., 1888, p. 474.
[2] Ib., xiii., 1887, p. 15.
[3] Zeitschrift, f. Kryst., xiii., 1887, p. 25 and p. 386.
[4] Ib., xiii., 1887, p. 332.
[5] H. Mayer. Ib., xiii., 1887, p. 47.